Turkish Journal of Computer and Mathematics Education Vol.12 No.11 (2021), 1660-1665

Research Article

Land Use and Land Cover Change Detection Using Gis And Remote Sensing of Coimbatore District, Tamilnadu

Anitha Selvasofia S.D.[1], Shrividya S[2]., Karunya.S[3]., Kaviya.P[4] Sindhu Devi.P [5]

[1]Assistant Professor (Sr.Gr), Department of Civil Engineering, Sri Ramakrishna Engineering College, Coimbatore.
[2, 3, 4,5] Student, Department of Civil Engineering, Sri Ramakrishna Engineering College, Coimbatore.
sofiasamuel@srec.ac.in

Article History: Received: 10 January 2021; Revised: 12 February 2021; Accepted: 27 March 2021; Published online: 10 May 2021

Abstract: Modifications in Land use and land cowl is a dynamic technique taking location at the floor, and the spatial distribution of the modifications which have taken vicinity over a time frame and area is of substantial significance in lots of a herbal resources research. Land use/land cover mapping function a simple stock of land resources thru out the arena. Whether or not regional or neighbourhood in scope, far off sensing gives a method of acquiring and imparting land cowl facts in well-timed way. In recent years, faraway sensing and geographical data machine have gained importance as important gear in the evaluation of trade detection at district and city stage. This paper describes the adjustments in Land use/land cowl pattern of Coimbatore District in Tamil Nadu state in 2008 the Land use/land cowl pattern of Coimbatore metropolis 2016 if you want to locate the adjustments that has taken region in this popularity among these two durations. This study hyperlink with socio-monetary trade of Coimbatore in that period. The result of this work will show a speedy increase in land use of Coimbatore in the duration of 2008 to 2016.

Keywords: Land use and Land Cover, Remote Sensing, GIS.

I. INTRODUCTION

Land use is truly restrained with the aid of environmental factors inclusive of soil characteristics, climate, topography, and flowers. But it additionally displays the significance of land as a key and finite aid for maximum human activities consisting of agriculture, enterprise, forestry, power manufacturing, agreement, activity, and water catchments and storage. Land is an important thing of production, and through a great deal of the route of human history, it's been tightly coupled with monetary boom. Frequently unsuitable land use is causing various kinds of environmental humiliation.

For sustainable usage of the land ecosystems, it's far essential to recognize the natural characteristics, extent and area, its exceptional, productiveness, suitability and obstacles of diverse land uses. Land use is a product of interactions among a society's cultural background, kingdom, and its bodily desires on the only hand, and the natural capability of land on the opposite .for you to enhance the financial situation of the location without similarly deteriorating the bio environment, every little bit of the to be had land has to be used inside the maximum rational way. This calls for the prevailing and the beyond landuse/ land cover information of the Coimbatore place

The land use/land cowl pattern of a area is an final results of herbal and socio – monetary elements and their usage via guy in time and space. Land is turning into a scarce aid because of giant agricultural and demographic strain. hence, records on land use / land cowl and possibilities for his or her optimum use is essential for the choice, planning and implementation of land use schemes to fulfil the growing demands for simple human wishes and welfare. This record also assists in monitoring the dynamics of land use resulting out of changing demands of growing populace. Land use and land cover exchange has become an essential element in contemporary techniques for managing natural resources and monitoring environmental modifications. The development in the idea of flowers mapping has substantially accelerated research on land use land cowl trade as a consequence presenting an accurate evaluation of the spread and health of the arena's forest, grassland, and agricultural resources has emerge as an vital priority. Viewing the Earth from area is now vital to the understanding of the impact of man's sports on his herbal useful resource base through the years. In situations of fast and often unrecorded land use trade, observations of the earth from space provide goal facts of human usage of the panorama. during the last years, statistics from Earth sensing satellites has emerge as critical in mapping the Earth's functions and infrastructures, managing natural resources and reading environmental trade. The records being in digital form can be added into a Geographical information system (GIS) to provide a appropriate platform for information evaluation, update and retrieval. Improvements in satellite far flung sensing, worldwide positioning systems and geographic statistics structures strategies within the past decade have significantly

assisted the gathering of land cover statistics and the combination of different records sorts. The prevailing have a look at was accomplished to evaluate the effectiveness of facts in and around Coimbatore on 1:25,000 scales by using satellite facts of LISS III and Base information from Topo sheet.

OBJECTIVES

- To detect the changes that have taken place for the past 8 years.
- To analyze the nature and extend of land use/ land cover in Coimbatore district.
- To predict the increase and decrease of the land use / land cover pattern.

II. STUDY AREA

Coimbatore lies at 11°1′6″N 76°58′21″E in south India at 411 metres (1349 ft) above sea level on the banks of the Noyyal River, in southwestern part of Tamil Nadu. It covers an area of 287.2893 sq.km. It is surrounded by the Western Ghats mountain on to the West and the Northern side, with reserve forests of the Nilgiri Biosphere Reserve on the northern side. The Noyyal River forms the southern boundary of the city, which has an extensive tank system fed by the river and rainwater. The eight major tanks and wetland areas of Coimbatore are namely, Singanallur, Valankulam, Ukkadam Periyakulam, Selvampathy, Narasampathi, Krishnampathi, Selvachinthamani, and Kumaraswami. Multiple streams drain the waste water from the city.

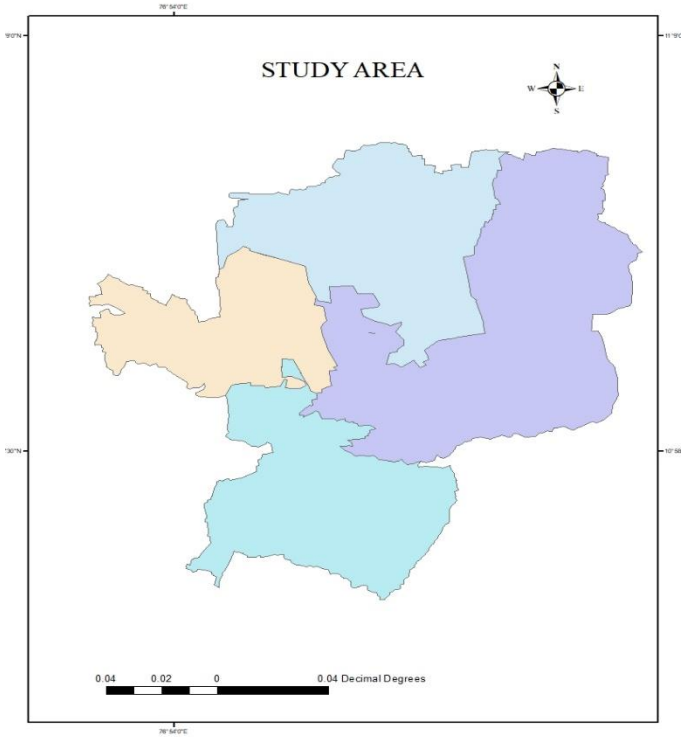

Figure 1 Study Area

III. DATA USED

Survey of India Topographical map on the 1: 50,000 scale for the year 2008.

IV. METHODOLOGY

Spatial Data

The spatial data provides exact geometric information such as location, and boundary extend were collected

Data Processing

The coordinates of the Ground Control Points (GCP) were collected with the help of hand held GPS in WGS1984 datum. The accident spot locations were converted into shape files using ArcGIS software. The accident details were added as attribute data. The Open Series maps (OSM) were geo-referenced using the given location. All Open Series map were integrated into a single map. The updated taluk and road network maps were geo-referenced using the geo-referenced OSM to identify the current taluk and Road Network. Digitized method is used to extract the vector data from the base raster data. The extracted layers are district boundary, taluk boundary, reserved forest and lakes. These layers were saved as shape files. These extracted and generated layers were added into the geo database.

(i) **Creating an empty shapefile**. Open ArcCatalog. We are going to create a new shapefile that we can edit in ArcMap—this will be a polygon feature shapefile to which we will add ward boundaries. In ArcCatalog, browse to the location of your current mxd file. This is the folder in which you will create your new shapefile, so select that folder and right-click on it. Go to New Shapefile to open the Create New Shapefile window. Give the polygon shapefile an appropriate name such as peelamedu. Click on Edit… to see the Coordinate System of the file. In the Spatial Reference Properties window click Import to use the projection of peelamedu street layer. Click OK and OK again to create the shapefile.

(ii)

(iii) **Add a new filed in the Attribute Table**. Return to ArcMap, and add your new shapefile to the Data Frame . If you open the Attribute Tables of this shapefile you will find it empty. Use the empty shapefile to create features from our image. Before start editing, first open its Attribute Table. Click on the Options button and Add Field… First create Spatial Structures in the Social Sciences Image/Map Georeferencing and Digitizing a Short Integer (choose in the Type drop-down menu) field called Wards where the Ward number identifier will be entered

(iv) Digitizing Wards and entering tabular data. View Toolbars Editor. On the toolbar, click on the Editor menu and Start Editing, choose the folder that your shapefiles are in, and then click OK. Before you get started creating polygons, turn off all but the registered Coimbatore image layer. In the Editor toolbar, Create New Feature, it is probably easiest to start with some rectangular shapes. Double clicking on where to started will finish your Sketch. This should make your polygon become an actual, filled polygon. If you make a mistake you can select and delete sketch.

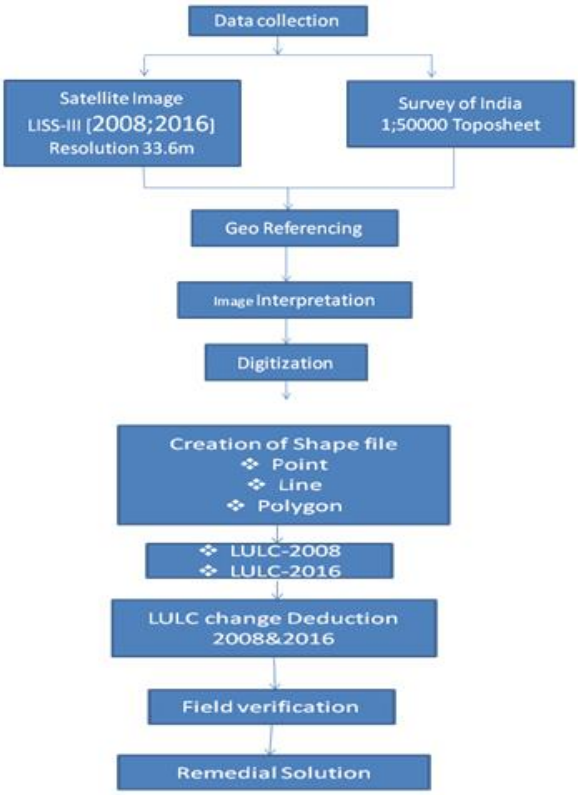

Figure 2 Methodology Layout

V. RESULT AND DISCUSSION

The results of land use/cover assessment based on visual interpretation for the year 2008 of LISS III satellite data has a total area of about 287.262 square km. In 2007-08 land use coverage, as follows, Build up areas covering is 78.06 %, Agricultural land occupies 15.28%, and forest coverage in this period is 2.53% while water body land use features occupied 4.13 %. The trend of the land use and land cover continued in the same manner in 2008-09 with the same order of importance.

The results of land use/cover assessment based on visual interpretation for the year 2016 of LISS III satellite data has a total area of about 365.739 square km. In 2015-16 land use coverage, as follows, Build up areas covering is 87.69 %, Agricultural land occupies 9.38%, and forest coverage in this period is 1.02% while water body land use features occupied 1.93 %.

In short, the most common variable explaining the changes in land use and land cover in Coimbatore is population growth. The variations in area covered under agriculture and fallow land attributed to changes in crop rotation, harvesting time and conversion of these lands into plantation. We can see the difference in land use and land cover in the comparison chart Figure 3.

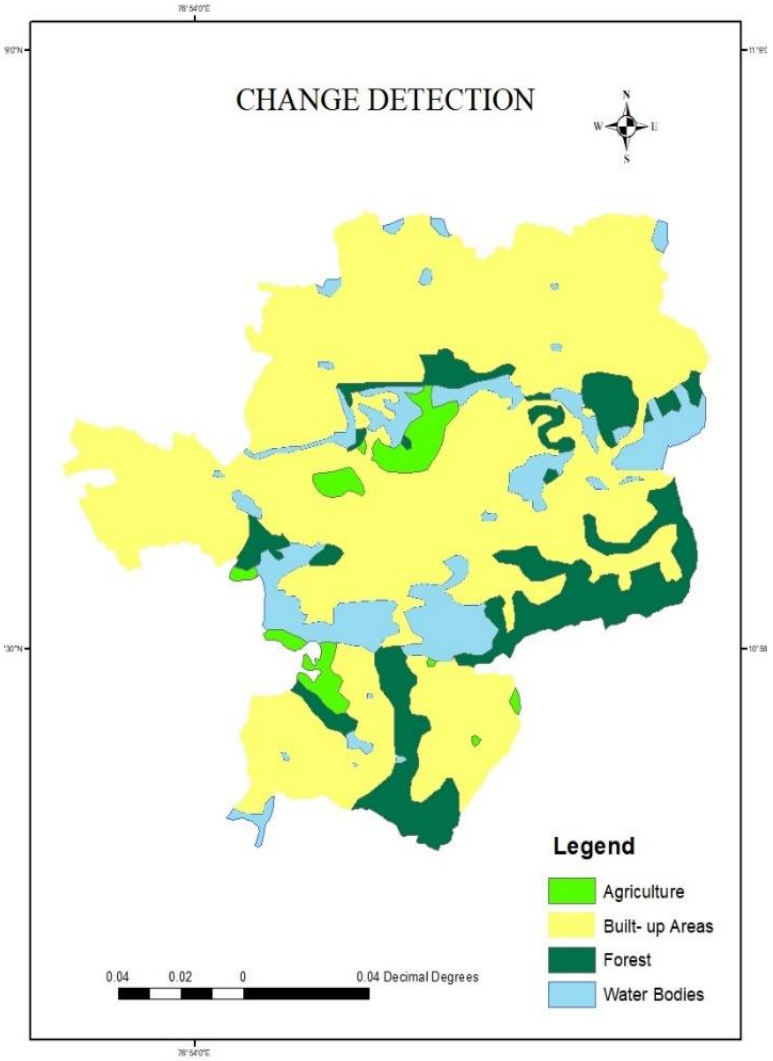

Figure 3 Change detection of the land use and land cover-2008

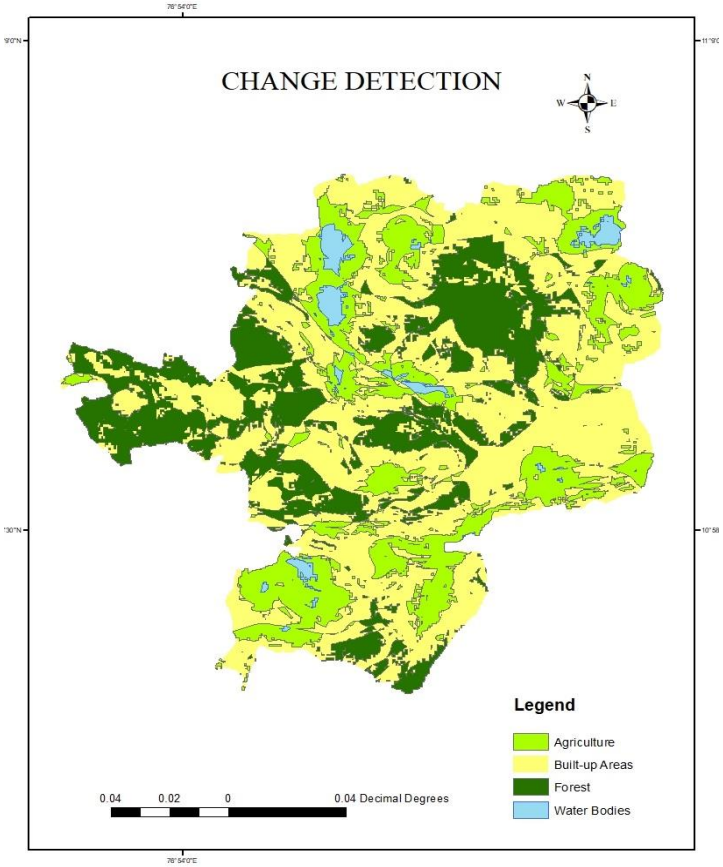

Figure 4 Change detection of the land use and land cover 2016

Table 1 Percentage of change detection in the primary features

Category	2008		2016		Change detection
	Area (Sq.km)	Area %	Area (Sq.km)	Area %	
Built-up areas	224.25	78.06	320.643	87.67	Increased
Agriculture lands	43.882	15.28	34.305	9.38	Decreased
Forest areas	7.26	2.53	3.731	1.02	Decreased
Water Bodies	11.87	4.13	7.060	1.93	Decreased
Total	287.262	100	365.739	100	

VI. CONCLUSION

The study has revealed that satellite data has the unique capability to detect the changes in land use quickly and accurately. From the analysis it has been found that the satellite data is very useful and effective for getting the results of temporal changes, with this effective data it has been found that the cropland is decreasing at the cost of hazard growth of plantation and settlements. This will help in maintaining the ecological balance and improving microenvironment of the region. The major conversion occurred in agriculture land to built-up land category due

to different anthropogenic reasons. The decrease of water bodies may be due to insufficient rainfall, non-perennial water flows in the river and encroachment.

References

A. Alphan, H., 2003. Land use changes and urbanization in Adana,Turkey, Land degradation and Development, 14, pp 575-586.

B. N.C.Anil, G.JaiSankar, M. JagannadhaRao, I.V.R.K.V.Prasad and U.Sailaja, Studies on Land Use/Land Cover and change detection from parts of South West Godavari District, A.P – Using Remote Sensing and GIS Techniques. J. Ind. Geophysics. Union, October 2011, Vol.15, No.4, pp.187-194.

C. Gautam, N.C.,& Narayanan, L.R.A., 1983. Landsat MSS data for land use/land cover inventory and mapping: A case study of Andhra Pradesh, J.IndianSoc, Remote Sensing, 11(3), pp 15-28.

D. Sarma, V.V.L.N., Murali Krishna, G., HemaMalini, B., &NageswaraRao, K., 2001. Landuse/Landcover Change Detection through Remote Sensing and its Climatic Implications in the Godavari Delta Region, Journal of the Indian Society of Remote Sensing.Vol. 29, No. 1&2.

E. Phukan P, Thakuriah G and Saikia R, LanduseLand Cover Change Detection Using Remote Sensing and GIS Techniques - Assam, India. International Research Journal of Earth Sciences Vol. 1(1), 11-15, April (2013).

F. Prakasam C., Land use land cover change detection through remote sensing approach: A case study of Kodaikanaltaluk, Tamilnadu, International journal of Geomaticsand geosciences, 1(2), 150-158 (2010).

G. Uma J. and Mahalingam B., cover changes of Land use analysis using Remote Sensing and GIS: A case study of Kanchipuram District Coastal Stretch – Tamil Nadu, International journal of Geomatics and Geosciences, 2, 188-195 (2011).

H. Kotoky P., Dutta M.K. and Borah G.C., Changes in land use and land cover along the Dhansiri river channel,Assam A remote sensing and GIS approach, Journal geological survey of India, 79, 61-68 (2012).

I. Kachhwaha T.S., Temporal monitoring of forest land for change detection and forest cover mapping through satellite remote sensing, In: Proceedings of the 6th Asian Conf. On Remote Sensing, Hyderabad, 77-83 (1985).

J. TiwariKuldeep, KhanduriKamlesh, Land Use / Land cover change detection in Doon valley (DehradunTehsil), Uttarakhand: using GIS& Remote Sensing Technique. International journal of Geomatics and Geosciences volume 2, no 1, 2011.

K. TuhinGhosh et.al. (2001) "Assessment of Landuse/Landcover Dynamics and shoreline Changes of Sagar Island through Remote Sensing". 22 Asian Conference on Remote Sensing, 59 Nov 2001.

L. Palaniyandi, M., &Nagarathinam, V (1997), "Land Use / Land Cover mapping and Change Detection using Space Borne data" Journal of the Indian Society of Remote Sensing, 25(1): pp 2733.

M. Y.Babykalpana,Landuse Landcover change detection using remotely sensed data for Coimbatore District, India. International Journal of Scientific & Engineering Research Volume 3, Issue 5, May-2012, ISSN 2229-5518.

N. LI.Jia-cun, QianShao-meng, ChenXue," Object Oriented Method of Land Cover Change Detection Approach Using High Spatial Resolution Remote Sensing Data", vol 3, IEEE transactions 2003, pp. 3005-3007.

O. Jain, S.K., 1992. Land use mapping of Tawi catchment using satellite data. Report No.CS72, National Institute of Hydrology, Roorkee, 52.